

# THE CAMBRIDGE STATISTICS DISCUSSION GROUP

**Tuesday 3rd October 2006 7:15 for 7:45**

Large Lecture Theatre,  
MRC Cognition and Brain Sciences Unit,  
Chaucer Road, Cambridge

## **BLUP combines effect size and significance**

**Nick Galwey**  
GlaxoSmithKline, Harlow

**Abstract:** Analysis of the association between a disease phenotype and a genetic marker locus typically gives an estimate of the magnitude of the association effect (e.g. an odds ratio or a regression coefficient) and a measure of its significance (a  $\chi^2$  or  $t$  statistic, with its associated  $p$  value). Both of these statistics are of importance when deciding which loci are worth investigating further. A large estimated effect is of little interest if the estimate has low precision and a high  $p$  value: the effect may well not be real. Conversely, even a highly significant effect is of little interest if it is very small. It would be of value to combine the estimated effect and the significance level into a single statistic: such a statistic is provided by the Best Linear Unbiased Predictor (BLUP) or 'shrunk estimate'. The concept of the BLUP, which is supported by a well-established body of statistical theory, will be illustrated by considering the effect of a genetic marker locus on a continuous phenotypic trait. The BLUP will then be used to evaluate the association between each of a set of genetic markers (SNPs) and a quantitative trait in a sample of individuals. The ranking of the SNPs as candidates for further investigation on the basis of the BLUP is shown to be closely related to, but not identical to, that obtained from the regression coefficient or the  $p$  value. It appears to be straightforward to extend the concept of the BLUP to the analysis of categorical phenotypes (e.g. to odds ratios in a case-control study).

**Speaker:** Nick was a demonstrator and lecturer at the University of Cambridge between 1979 and 1995. He then moved to Perth to lecture at the University of Western Australia from 1995 to 2001 before working as a statistical geneticist for Oxagen Limited for two years. He has worked in a similar capacity for GlaxoSmithKline since 2003.

**Annual General Meeting:** Nick's talk will be preceded by a brief Annual General Meeting.

**Directions** Chaucer Road is off Trumpington Road – if you are heading away from the city centre it is the first right after the junction with Brooklands Avenue. Number 15 is at the end on the left and is a large Victorian House with a more modern extension to its right. The entrance is in the porch located in the middle of the older section on the left as you come in and is accessed by ascending a few steps from the car park. Cars may be parked there. The outside door will be locked at 7:45. Arrivals after 7:45pm can gain admittance by contacting the secretary on 07761769436. A map showing the location of the unit is at <http://www.mrc-cbu.cam.ac.uk/contact/contact-map.shtml>

**Provisional Next Meeting:**

29th November – Sheila Bird (MRC Biostatistics).

6th February – Julia Gog (Zoology).

**Supper:** Some members eat before a talk at the University Centre meeting in the downstairs bar at **5-45pm**. All welcome !

**Secretary:** Peter Watson, MRC Cognition and Brain Sciences Unit, 15 Chaucer Road, Cambridge CB2 2EF;

telephone 01223 355294 Extension 801; E-mail [peter.watson@mrc-cbu.cam.ac.uk](mailto:peter.watson@mrc-cbu.cam.ac.uk)

**For security purposes could you please let Peter Watson know if you intend attending the talk.**

**TURN OVER for the Annual General Meeting agenda**

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## **Annual General Meeting**

The annual general meeting will be followed immediately by Nick Galwey's talk 'BLUP combines effect size and significance '.

### **Agenda:**

0. Approval of Minutes of previous A.G.M.
1. Treasurer's Report.
2. Secretary's Report.
3. Election of Chairman, Secretary, Treasurer, plus 3 other members of the Committee.
4. Any Other Business.

### **Rules for Election:**

1. FRANCISE: All paid-up members may vote or stand for office.
2. NOMINATIONS: The offices to be filled are Chairman, Secretary and Treasurer and three other members of the Committee.

An outgoing Chairman will be a member of the Committee ex officio. At the end of each year the entire Committee will stand down, but may stand again for the same office as they are leaving without nomination. To be elected to a different office a candidate must be nominated by one person from the paid-up membership, not including himself. Nominations do not require a seconder to be valid, but do require the consent of the nominee. One person can be nominated for more than one office, but hold only one. If a person is elected to a higher office (according to the ordering given below) he or she automatically ceases to be a candidate for a lower office. A candidate for the post of Chairman, Secretary, Treasurer is automatically a candidate for the Committee if he or she fails to gain election to one of these three posts.

**TURN OVER for the directions to the Large Lecture Theatre and the abstract of Nick's talk**